

REMARKS

In response to the Official Action mailed December 18, 2003, Applicants request reconsideration. No claims are added or cancelled so that claims 1-4 remain pending.

The invention concerns an apparatus and a method for controlling the excitation of a synchronous machine, particularly a generator, that is connected to a power grid, i.e., a power transmission system. The apparatus that is claimed includes respective detectors for detecting the voltage at the output terminal of the synchronous machine and the reactive current produced by the synchronous machine at any given time. This measured information is supplied to a voltage setting means that establishes a reference voltage as the voltage to be produced at the output terminal of the synchronous machine. That reference voltage is based upon the reactive current that is measured, a reference voltage at the output side of the transformer that is connected to the power transmission system, and a phase compensation transfer function. As explained in the patent application, the phase compensation transfer function enables the claimed apparatus to recover from a fluctuation in voltage of the system more quickly than if this transfer function is not present. Based upon an error signal, namely the difference between the reference voltage established for the output terminal of the synchronous machine and the actual voltage at the output terminal of the synchronous machine, a control adjusts the excitation of the synchronous machine. The excitation is typically the magnitude and/or phase of the current supplied to windings of the synchronous machine that is responsible, together with the rotation of the rotor of the synchronous machine, for providing the power output from the machine.

The method claimed in claims 3 and 4 is analogous to the apparatus claimed in claims 1 and 2.

Claims 1-4 were rejected as obvious over Frierdich et al. (U.S. Patent 4,264,856, hereinafter Frierdich) in view of Genrikh et al. (U.S. Patent 4,085,338, hereinafter Genrikh). This rejection is respectfully traversed. Genrikh was newly cited in order to describe a synchronous generator connected through a transformer to a power grid. Assuming, for the sake of argument, that such a description is present in Genrikh, then, for the rejection to be correct, all of the other elements of the claims must be disclosed by Frierdich. For the same reasons already presented in responding to the first Official Action, Frierdich fails to disclose those other elements of claims 1-4.

In rejecting claims 1 and 2, the Official Action sets out at pages 2 and 3 the grounds for the rejection. With regard to the first element of claim 1, the Examiner stated

that element 47 in Frierdich is a voltage detecting means that detects the voltage at an output terminal of the synchronous machine 11 described in Frierdich.

In comparing the second paragraph of claim 1 to Frierdich, the Examiner asserted that element 27 in that reference is a reactive current detecting means. This statement is erroneous. Column 2, lines 32-34 of Frierdich describes element 27 as input power terminals for powering the regulator 23 employed in the apparatus described by Frierdich. Element 27 cannot detect the reactive current produced by the synchronous machine 11. Moreover, not only are the input power terminals 27 of the regulator 23 not a reactive current detecting means, Frierdich does not even use the term "reactive current" nor provide any element that could detect reactive current in the power produced by the generator 11. On that ground, the rejection of claim 1 based upon Frierdich cannot be properly maintained.

The final line on page 2 and the first five lines at page 3 of the Official Action asserting that Frierdich describes the setting of a reference voltage based upon a measured reactive current, a reference voltage, and a phase compensation transfer function is merely a recitation of part of claim 1. There is no citation to any location within Frierdich disclosing such elements. A detailed study of the reference indicates there are no corresponding elements anywhere in Frierdich.

The voltage setting means of the third paragraph of claim 1, which is employed to set the reference voltage at an output terminal of the synchronous machine, so that there is a baseline for calculating an error voltage, was compared by the Examiner to the voltage boosting stages 41, 43, and 45 of Frierdich. As explained in that patent, based upon the currents flowing in the respective output phases of the generator 11, the units 41, 43, and 45 impress upon the field winding 21 voltages that alter the excitation of the generator 11. When excessive current flows in one or more phases of the generator, indicating a fault, the feedback system of Frierdich maintains the high output current for a sufficient period of time to allow clearing of the fault by switchgear or other protective means.

A reference voltage level is set within the sensor 47 of Frierdich using a Zener diode, as shown in Figure 2 of the reference. That diode has a fixed breakdown voltage that establishes a reference voltage. That diode and the sensor 47 in Frierdich do not provide, as in the claimed invention, for establishing a reference based upon variable factors, such as the reactive current flowing. In other words, contrary to the assertion of the Official Action, there is no voltage setting means in Frierdich that could possibly correspond to, i.e., anticipate, that element of claim 1.

The final element of claim 1 is a control means. No specific control means within Frierdich was cited in the Official Action as corresponding to this claimed element. According to the Official Action, the exciting system of Frierdich is element 35, shown as a broken line in Figure 1 of the reference. Within that broken line 35 are elements already cited once by Examiner in attempting to show the presence of other elements of claim 1 in the apparatus of Frierdich. Thus, the rejection with regard to the final element of claim 1 is erroneous because the Examiner has twice counted elements in the reference as corresponding to different individual elements of the claimed invention. Moreover, the control means described by Frierdich does not establish an error signal for feedback control based upon a reference voltage set by the voltage setting means of the invention since there is no corresponding element within Frierdich. It follows that there is no control means within Frierdich that could correspond to the final element of claim 1.

To summarize, Frierdich, even as modified by Genrikh, cannot establish obviousness of either of claims 1 and 2 because there is no correspondence between many of the elements of claim 1 and what is described in Frierdich. The rejection of claim 1 is legally and factually erroneous, so that the rejection of claim 2, a dependent claim, does not require discussion.

In rejecting the method claims 3 and 4, the Examiner did not set forth any correspondence between particular parts of Frierdich and Genrikh and the steps of those claims. Rather, claim 3 was reproduced in the Official Action and attention was directed to column 4, lines 1-51 of Genrikh and column 10, line 5 to column 11, line 35 of Genrikh as meeting claim 3. With the exception of a few lines, most of the cited passage of Frierdich is directed to the specific circuitry illustrated in Figures 2 and 2A of Frierdich and has nothing to do with how Frierdich's apparatus operates, i.e., a method like that claimed in claims 3 and 4. The passage cited could have pertinence to very detailed apparatus claims, but claims 3 and 4 are method claims to which column 3 of Frierdich would seem more pertinent. Even that passage has nothing in common with the method claims for reasons that are analogous to the foregoing discussion with respect to the apparatus claims 1 and 2.

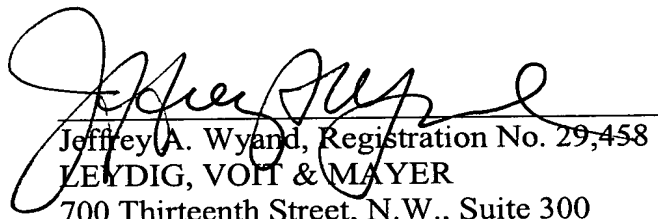
The cited passage of Genrikh describes in detail how the formation of ice on high voltage lines is avoided. This discussion has essentially nothing to do with the present invention. The rejection as to method claims 3 and 4 is, therefore, erroneous for essentially the same reasons that the rejection of the analogous apparatus claims 1 and 2 is erroneous.

In re Appln. of Kitamura et al.
Application No. 10/030,986

Since the rejection is erroneous and no amendment has been made in response to the prior art rejection, any new rejection based upon newly applied prior art or a different legal ground cannot properly be a final rejection.

Reconsideration and allowance of claims 1-4 are appropriate and earnestly solicited.

Respectfully submitted,


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